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DEVELOPMENT TOOLS

Aurduino Hardware User Manual

Basic information on the AURduino development board

Connectors, board layout, component placement, power options

PRELIMINARY

Hardware User Manual!
4269.40100, V0.4, 2015-02

Hardware Manual

Edition 2015-02

Published by:
Hitex (U.K.) Limited.
University Of Warwick Science Park, Coventry, CV4 7EZ, UK
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Document Change History

Date	Version	Changed By	Change Description
8/8/2014	0.1	M Beach	First version
9/8/2014	0.2	M Beach	Revised top view
20/2/2015	0.3	M Beach/D Greenhill	Revised for Rev B HW
9/4/2015	0.4	M Beach	Added board test

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1 Release Notes HW Revision B

1.1 AURduino RevB Known Problems

The Aurduino Revision B has a number of functional characteristics, listed below.

1. It will only run at 5V. It is possible to get 3V3 operation but this requires the changing of a voltage regulator and the changing of some resistors

1.2 CIC61508 (Safety version only)

The CIC61508 is programmed with the VANIA3.2 firmware release.

1.3 VIN Pin

The VIN pin on the AURduino power connector strip allows access to the 9-12V input from the power jack socket. This may be used to power shields that require a higher voltage e.g. the DC motor shield. In this case, please note that the maximum continuous current that can be drawn through this pin is 1.5A due to the 0.5mm track used..

2 Arduino-Based Connector Details

The Aurduino is based on the Arduino Due (SAM3X) form factor. Where possible, the pin functionality of the Due has been implemented using an equivalent Aurix peripheral.

2.1 Board Layout

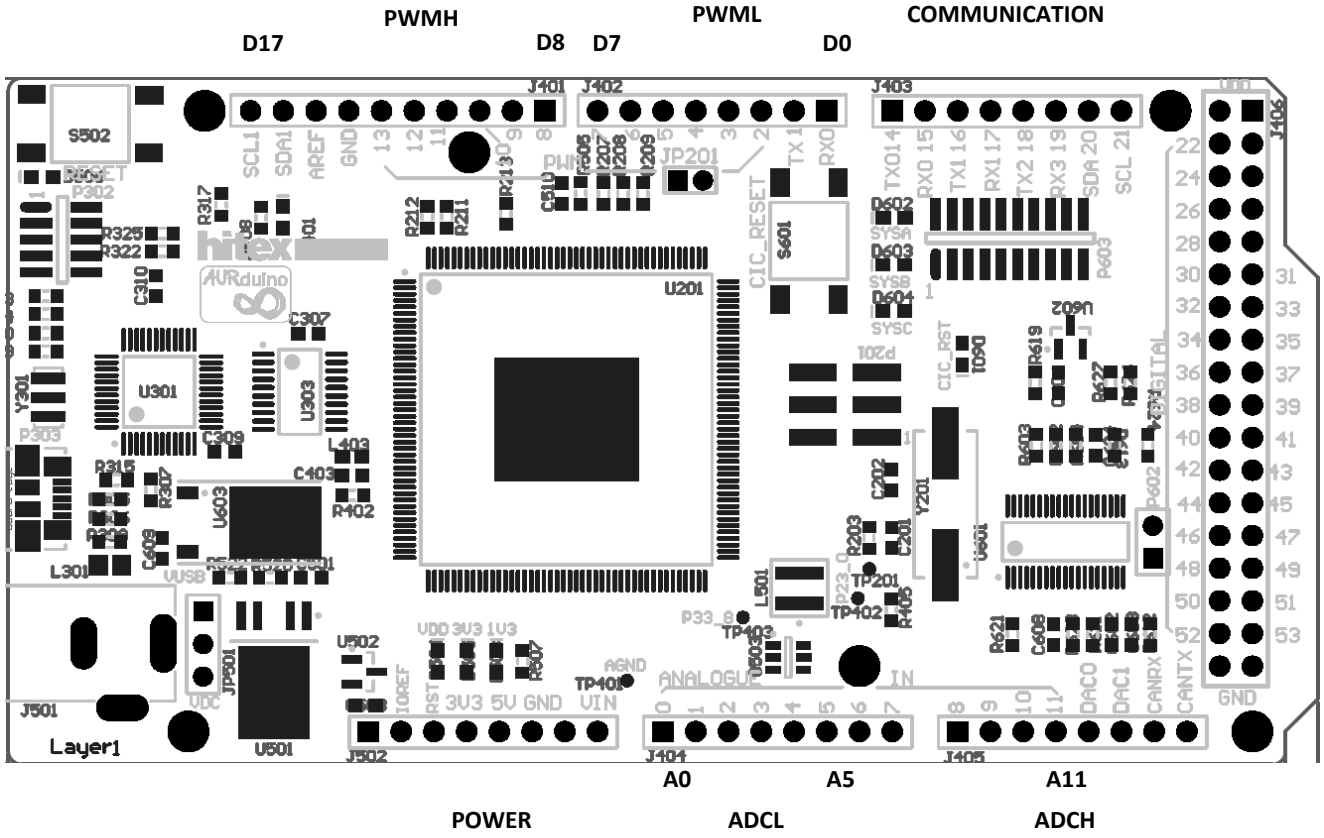
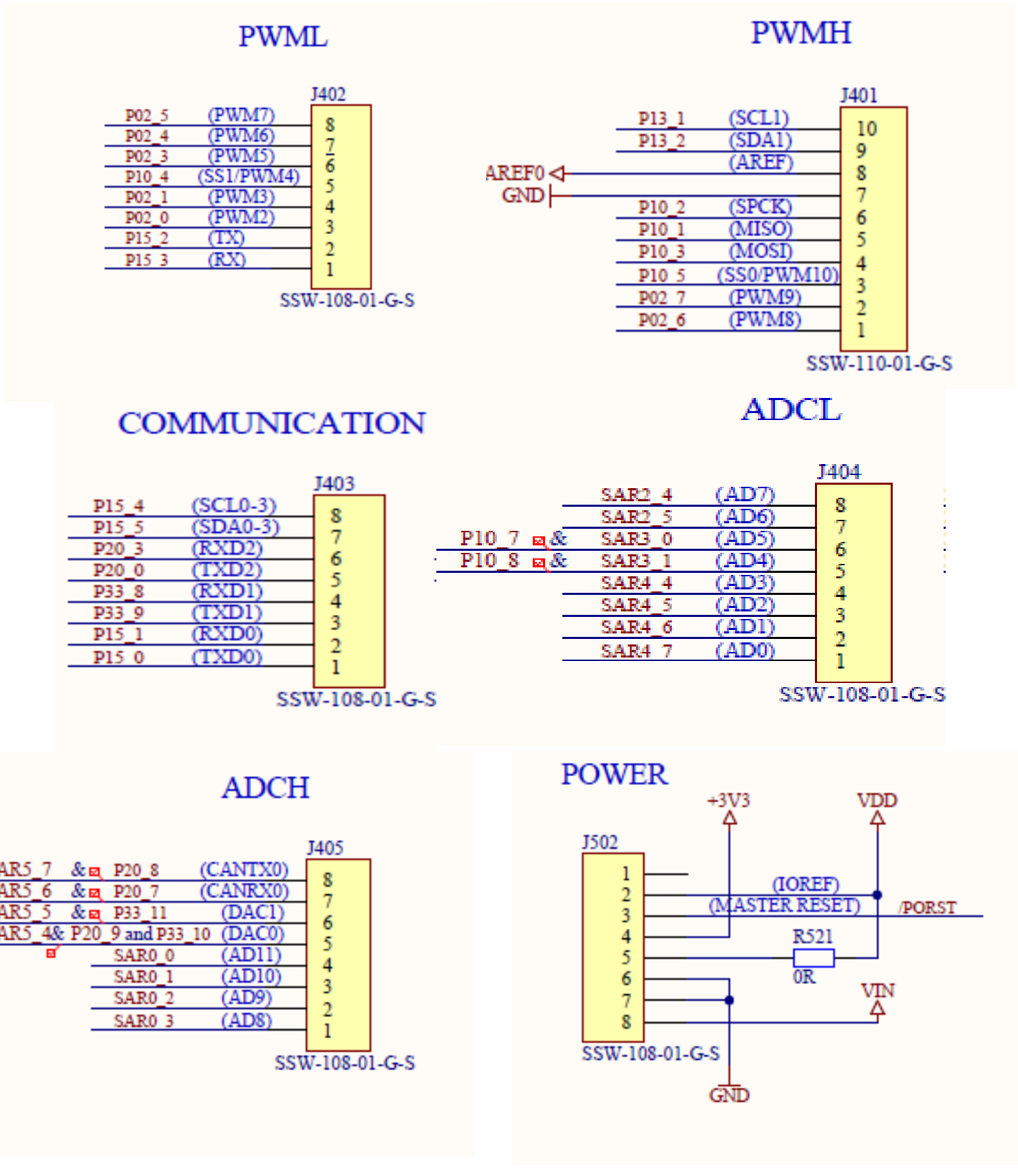


Figure 1 Top view of Aurduino

2.2 Connector Pin Allocation



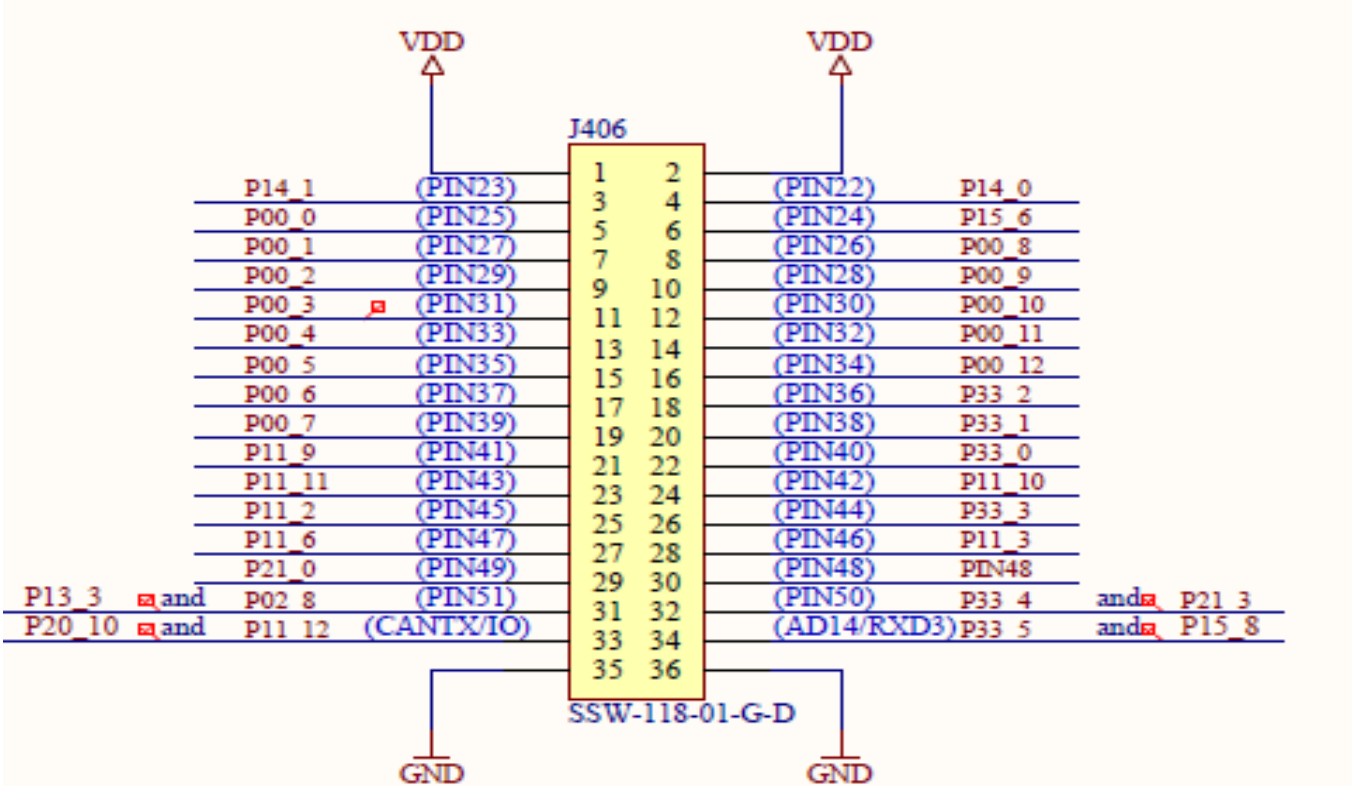


Figure 2 Extended IO Connector

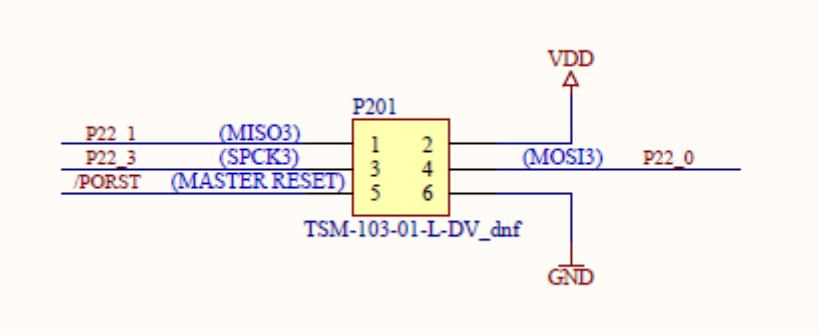


Figure 3 SPI Connector

2.3 TC275 ASCLIN to AURduino connector mapping

Table 1 ASCLIN to AURduino connector mapping

TC275 Port Pin	ASCLIN	Board Marking	Comment
P15.0	ASC1	TX0	Serial0
P15.1	ASC1	RX0	
P33.9	ASC2	TX1	Serial1
P33.8	ASC2	RX1	
P20.0	ASC3	TX2	Serial2
P20.3	ASC3	RX2	
P15.2	ASC0	TX	Serial
P15.3	ASC0	RX	
P15.7	ASC3	TX	SerialASC - Available via USB
P32.2	ASC3	RX	

Table 2 Arduino To AURduino To TC275 Mapping

Arduino Signal Name	AURduino Connector Name	TC275T Pin Assignment
Analog pin 0	ADCL.1	SAR4.7
Analog pin 1	ADCL.2	SAR4.6
Analog pin 2	ADCL.3	SAR4.5
Analog pin 3	ADCL.4	SAR4.4
Analog pin 4	ADCL.5	SAR3.0/P10.7
Analog pin 5	ADCL.6	SAR3.1/P10.8
Analog pin 6	ADCL.7	SAR2.5
Analog pin 7	ADCL.8	SAR2.4
Analog pin 8	ADCH.1	SAR0.3
Analog pin 9	ADCH.2	SAR0.2
Analog pin 10	ADCH.3	SAR0.1
Analog pin 11	ADCH.4	SAR0.0
Analog pin 12/DAC0	ADCH.5	SAR5.4/P20.9/P33.10
Analog pin 13/DAC1	ADCH.6	SAR5.5/P33.11
Analog pin 14/CAN RX	ADCH.7	SAR5.6/P20.7 CAN0 RX
Analog pin 15/CAN TX	ADCH.8	SAR5.7/P20.8 CAN0 TX
Digital pin 4 (PWM/SS)	PWML.5	P10.4
Analog Reference AREF	PWMH.8	AREF
Digital pin 0 (RX0)	PWML.1	P15.3
Digital pin 1 (TX0)	PWML.2	P15.2
Digital pin 2 (PWM)	PWML.3	P2.0
Digital pin 3 (PWM)	PWML.4	P2.1
Digital pin 5 (PWM)	PWML.6	P2.3
Digital pin 6 (PWM)	PWML.7	P2.4
Digital pin 7 (PWM)	PWML.8	P2.5
Digital pin 8 (PWM)	PWMH.1	P2.6
Digital pin 9 (PWM)	PWMH.2	P2.7
Digital pin 10 (PWM/SS)	PWMH.3	P10.5
Digital pin 11 (PWM/MOSI)	PWMH.4	P10.3
Digital pin 12 (PWM/MISO)	PWMH.5	P10.1

Arduino Signal Name	AURduino Connector Name	TC275T Pin Assignment
Digital pin 13 (PWM/SPCK)	PWMH.6	P10.2
Digital pin 14 (TX3)	COMMUNICATION.8	P15.0 ASC1 RX TXCAN2
Digital pin 15 (RX3)	COMMUNICATION.7	P15.1 ASC1 RX RXCAN2
Digital pin 16 (TX2)	COMMUNICATION.6	P33.9 ASC2 TX
Digital pin 17 (RX2)	COMMUNICATION.5	P33.8 ASC2 RX
Digital pin 18 (TX1)	COMMUNICATION.4	P20.0 ASC3 TX
Digital pin 19 (RX1)	COMMUNICATION.3	P20.3 ASC3 RX
Digital pin 20 (SDA)	COMMUNICATION.2	P15.4
Digital pin 21 (SCL)	COMMUNICATION.1	P15.5
Digital pin 22	XIO.3	P14.0
Digital pin 23	XIO.4	P14.1
Digital pin 24	XIO.5	P15.6
Digital pin 25	XIO.6	P00.0
Digital pin 26	XIO.7	P00.8
Digital pin 27	XIO.8	P00.1
Digital pin 28	XIO.9	P00.9
Digital pin 29	XIO.10	P00.2
Digital pin 30	XIO.11	P00.10
Digital pin 31	XIO.12	P00.3
Digital pin 32	XIO.13	P00.11
Digital pin 33	XIO.14	P00.4
Digital pin 34	XIO.15	P00.12
Digital pin 35	XIO.16	P00.5
Digital pin 36	XIO.17	P33.2
Digital pin 37	XIO.18	P00.6
Digital pin 38	XIO.19	P33.1
Digital pin 39	XIO.20	P00.7
Digital pin 40	XIO.21	P33.2
Digital pin 41	XIO.22	P11.9
Digital pin 42	XIO.23	P11.10
Digital pin 43	XIO.24	P11.11
Digital pin 44 (PWM)	XIO.25	P33.3
Digital pin 45 (PWM)	XIO.26	P11.2
Digital pin 46 (PWM)	XIO.27	P11.3
Digital pin 47	XIO.28	P11.6
Digital pin 48	XIO.29	P21.3 (B-step) P21.1 (A-step) via link
Digital pin 49	XIO.30	P21.0
Digital pin 50 (MISO)	XIO.31	P33.4 + P21.3
Digital pin 51 (MOSI)	XIO.32	P2.8 + P13.3
Digital pin 52 (SCK)	XIO.33	P33.5 + P15.8
Digital pin 53 (SS)	XIO.34	P11.12 + P20.10
SPI connector 1	MISO3	P22.1
SPI connector 2	+5V	
SPI connector 3	SPCK3	P22.3
SPI connector 4	MOSI3	P22.0
SPI connector 5	RESET	
SPI connector 6	GND	
I2C SDA1	PWMH.10	P13.1
I2C SCL1	PWMH.9	P13.2
GND	PWMH.7	GND

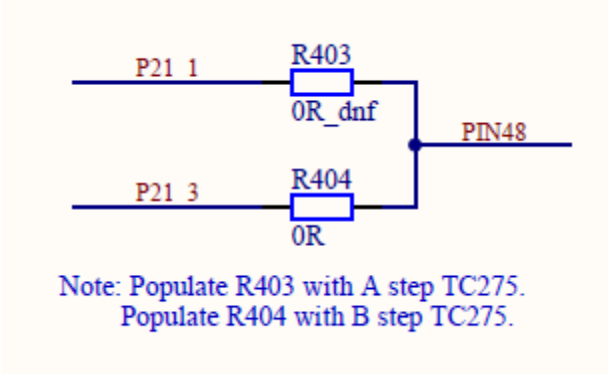
3 Powering The AURduino

The Aurduino can be powered from USB or from 7-12V on the jack socket. The switch S501 allows the power source to be selected. The jumper position towards the centre of the board selects USB power.

It is possible to power the board from just the USB however some shields require more current than can be supplied via USB so in the case, the external power jack should be used.

When powered from the external jack, the CIC61508 has its own independent power regulator, as required by the safety architecture. When using USB power, the CIC61508 shares is power supply with the Aurix. This is the non-safety configuration, for development use only.

3.1 Selectable Options



3.2 Restoring an AURduino with a completely erased FLASH.

If the TC275 PFLASH becomes completely erased or if the bootmode headers are damaged, the device can no longer be accessed via JTAG or DAP. The debugger will report “No Valid ABM On Target” and the FLASH cannot be programmed, even though it might appear to have been. To overcome this, JP201 can be used to temporarily enable the debug interface so that the PFLASH can be reprogrammed. To do this, follow the procedure given below:

With the AURduino powered up:

1. Close the jumper JP201
2. Press the reset button
3. Remove the jumper on JP201
4. Attempt to start your Flash programming tool or debugger
5. The tool should now connect
6. Reprogram the PFLASH in the usual way

4 Underside Component Placement

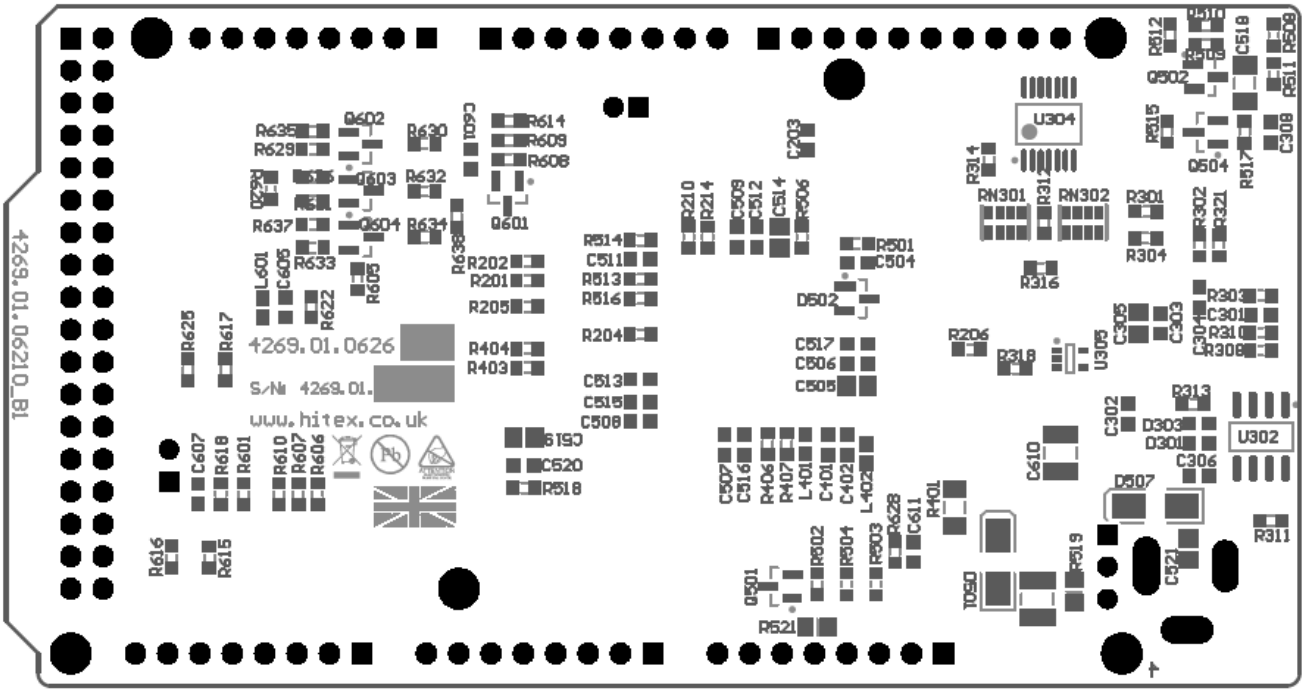


Figure 4 Bottom view of Aurduino

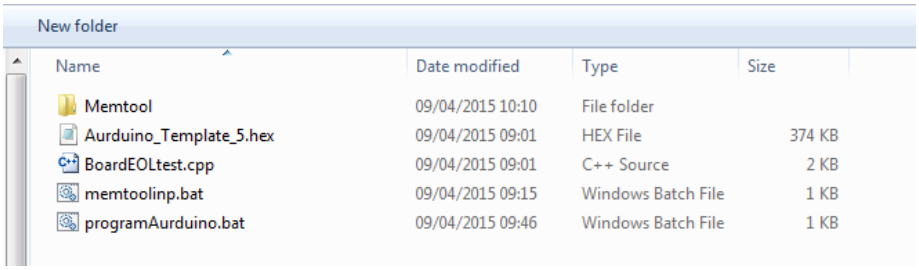
5 Appendices

5.1 Basic Board Test

If you think your Aurduino has been damaged, please run this simple test to see if the CPU is still OK.

Note: It is assumed that Infineon DAS v4.6 or later is already installed on your PC.

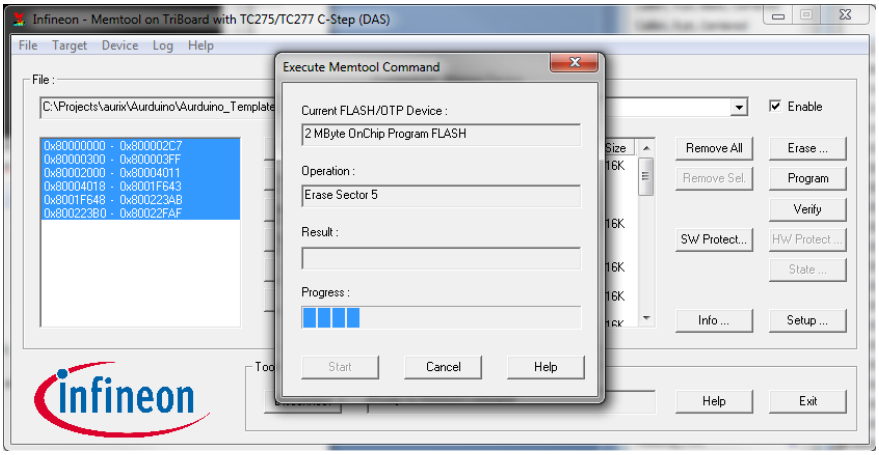
Unzip EOL_Test.zip using the password “aurduino” to create a new directory:



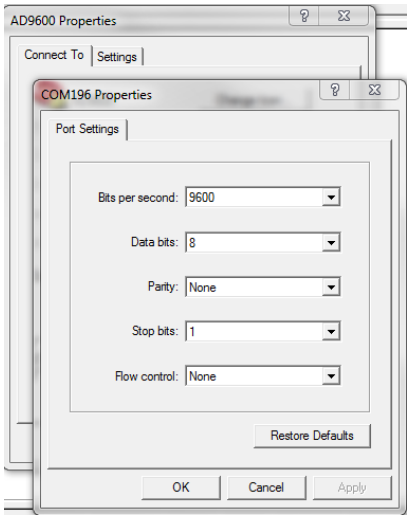
Connect the Aurduino to the USB port on your PC. Make sure that the jumper by the power jack socket is in the “USB” position.

Wait for DAS to detect the Aurduino – this takes about 15 seconds. Run the batch file “programAurduino.bat”.

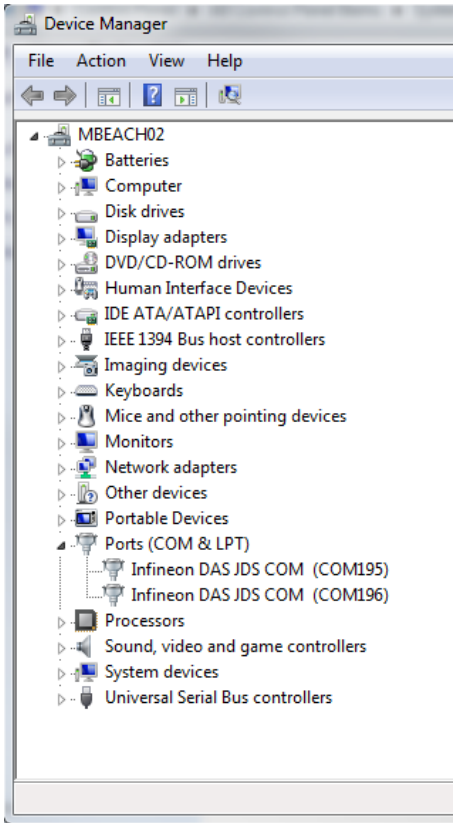
The Memtool programming tool will start and program the Aurduino_Template_5.hex hexfile into the TC275 FLASH.



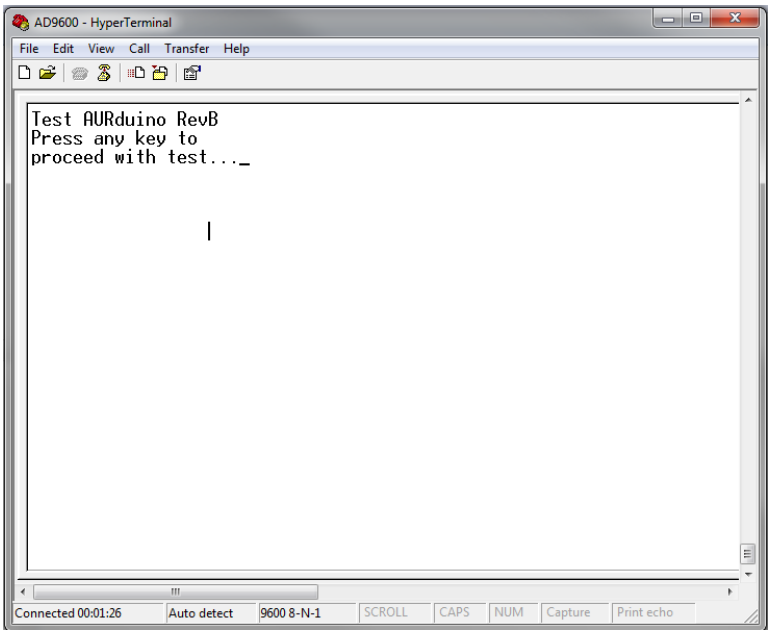
Now start a terminal emulation program (e.g. putty, MTTY, Hyperterm etc.) and use the following serial parameters:



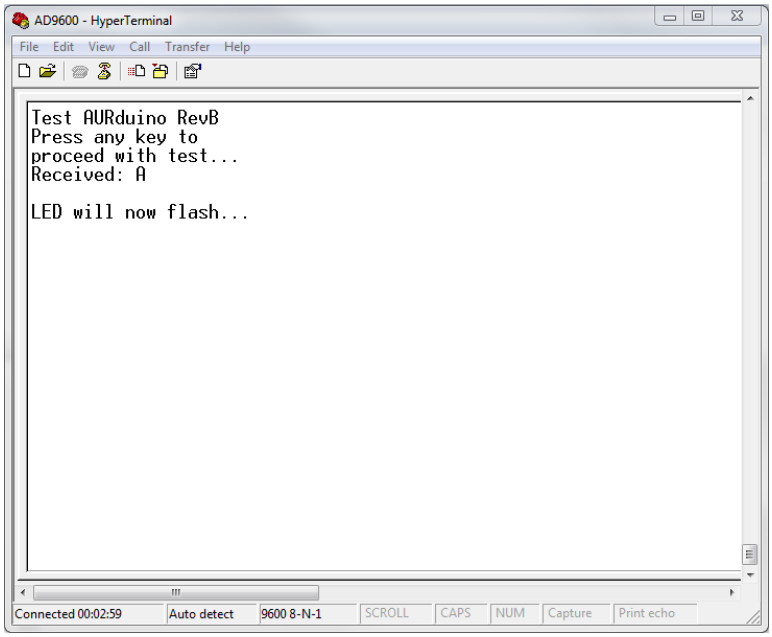
The COM port created by the Aurduino will vary from PC to PC. You can find it in the Windows Control Panel - Device Manager under Ports (COM & LPT). Here it is COM196. Note it is usually the second virtual comport that is the active one. Make sure your terminal program is using this comport!



With the terminal program running, press the reset button on the Aurduino. The following text should appear:



Now press any alpha key – here it was 'A'. The key you pressed will be printed into the terminal and the LED on the Aurduino should start to flash.



That completes a successful test.

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